YEARS OF POTENTIAL LIFE LOST

The more traditional approach to cause of death analysis relies on frequency of death. This perspective emphasizes diseases that affect older ages, simply because of the larger number of such deaths. Years of potential life lost (YPLL) is an alternative measure that highlights premature, preventable, and unnecessary mortality. There are a number of different calculations for YPLL, each with a slightly different emphasis. Here we use the "premature years of potential life lost" calculation, which is easily understood and is used by the Center for Disease Control and Prevention (CDC). For each decedent younger than 75, the age at death is subtracted from 75. The results are summed by cause of death. This measure is referred to here as YPLL-75.

Frequencies for the ten leading causes of death for Montana residents are reported in **Table 24**. The ten leading causes are: heart disease (25.2% of all resident deaths); cancer (22.8%); cerebrovascular disease (7.3%); chronic lower respiratory diseases (CLRD)—(7.0%); accidents (5.7%); pneumonia and influenza (3.1%); diabetes (3.0%); Alzheimer's disease (2.5%); suicide (2.0%); and nephritis, nephrotic syndrome and nephrosis (1.2%). **Figure 51** represents the traditional view of cause of death analysis, showing the frequency, or number of deaths, in each cause of death category. All Montanans who died in 1999 are reflected in this figure.

An alternative perspective, YPLL-75, is reflected in **Figure 52**. Only decedents younger than 75 at the time of death are reflected in this figure. Accidents, cancer, heart disease, and suicide comprise 43% of the total loss, for 1999, as measured by YPLL-75. Society's losses include emotional and financial support for families of the decedents and productivity for the economy as a whole. The decedents, of course, lose life itself.

In 1999, the total loss of life before age 75 was 60,119 years. The loss to society resulting from all accidental deaths was 12,825 years, more than 21.3% of total YPLL for 1999. These deaths represent the single greatest YPLL-75 among all the causes of death. Motor vehicle accidents alone accounted for a loss of 6,894 years (11.5%). Cancer, heart disease and suicide also caused large losses to society, accounting for 12,709 years (19.2%)--8,520 years (14.2%); and 4,465 years (7.4%), respectively.

Regardless of which of these two perspectives is used, heart disease and cancer cause a large social loss because of the numbers of deaths they cause, both in the total population and the population under age 75. The YPLL-75 perspective, however, reorders the ranking of the leading causes of death, highlighting areas the CDC has said "provide the greatest potential for health improvement." Accidental death was only the fifth leading cause of death using frequency of death, but ranks first in terms of YPLL-75, indicating that accidental deaths are prevalent in those less than 75 years of age and cause great losses to society due to premature death. Suicide ranked ninth by frequency, but became the fourth leading cause when measured with YPLL-75.

Average YPLL-75 is calculated by dividing the total YPLL-75 for each cause of death by the number of deaths of decedents less than 75 years of age. While total YPLL-75 emphasizes the loss to society in terms of years of lost life, average YPLL-75 emphasizes the loss to the individual. This measure is shown in **Figure 53.**

Conditions originating in the perinatal period create the greatest average loss to an individual (75 years lost). External causes of death--including motor vehicle accidents (40.1 years), other accidents (34.1), homicide (40.3), and suicide (33.1)--create the next largest category of average loss. HIV also creates relatively high average.

In general, average YPLL-75 was highest when median age was lowest. For instance, Alzheimer's had the second lowest associated average YPLL-75, 5.4 years per decedent younger than 75, and the highest associated median age, 86.5 years. There were notable exceptions, however, because average YPLL-75 is influenced by both the age at which decedents died and the number of decedents under age 75 in the cause-of-death category in question. Those dying of pneumonia and influenza had a median age of 86 years but an average YPLL-75 of 24.6 years, a value roughly in the middle of the values for that measure.

Figure 51

FREQUENCY OF DEATH BY CAUSE OF DEATH
MONTANA RESIDENTS, 1999

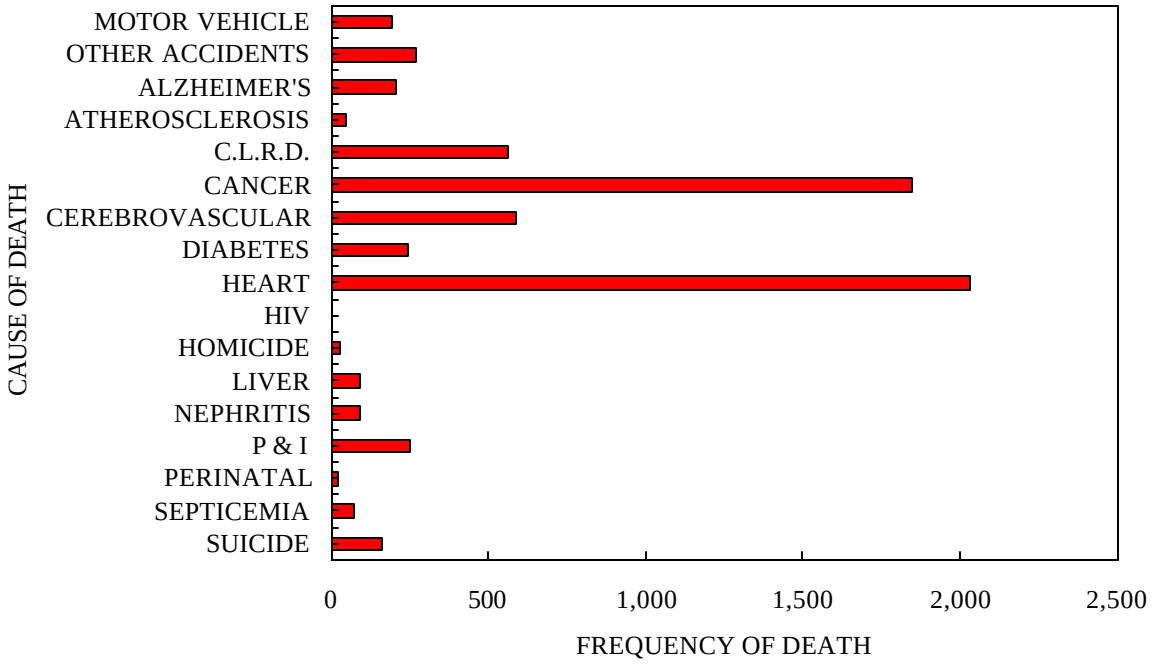

Figure 52

TOTAL YEARS OF POTENTIAL LIFE LOST BEFORE AGE 75
BY CAUSE OF DEATH
MONTANA RESIDENTS, 1999

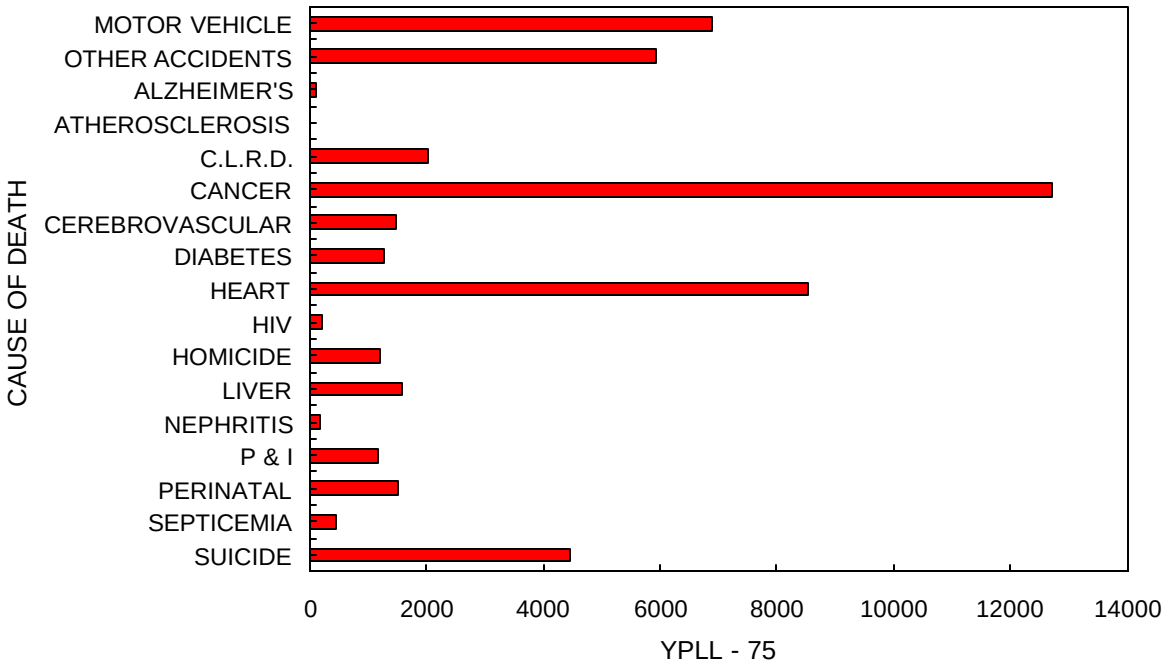

Figure 53

AVERAGE YEARS OF POTENTIAL LIFE LOST BEFORE AGE 75
BY CAUSE OF DEATH
MONTANA RESIDENTS, 1999

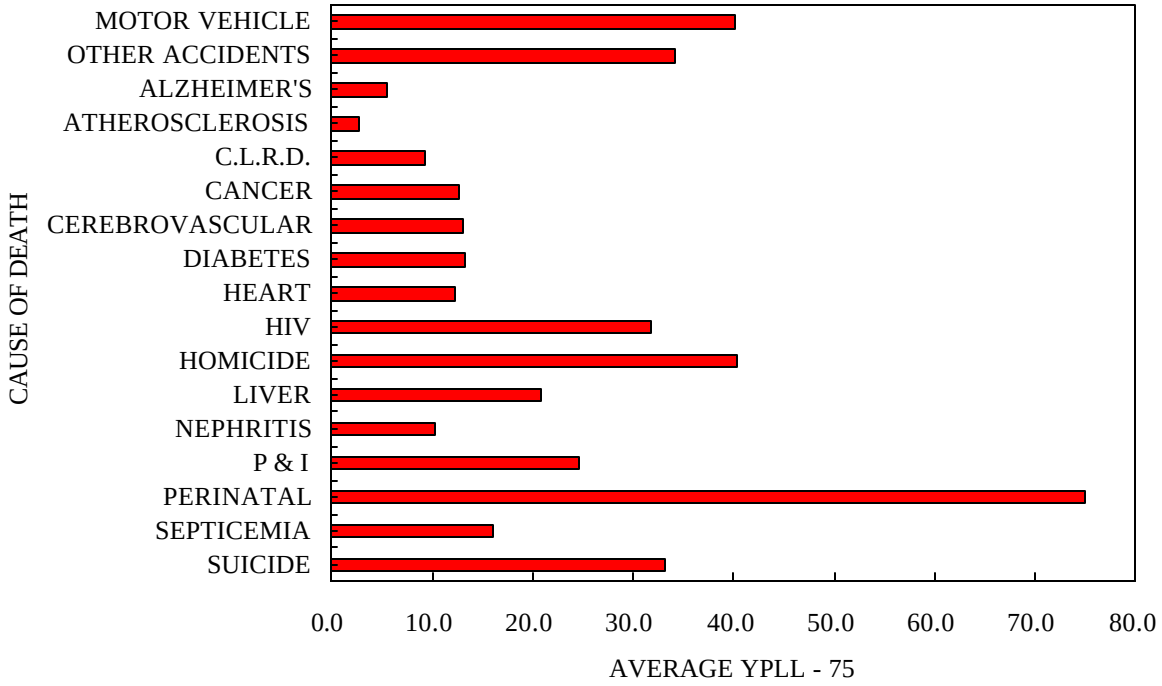

Figure 54 summarizes average and total YPLL-75, frequency of death, and age at death for these same 17 causes of death. The left side of the table shows YPLL-75 and related measures--i.e., measures referring to the number of decedents in the ten-year period who died before the age of 75. The right side of the table shows statistics referring to all decedents, regardless of age. Causes of death are shown in descending order of average years of life lost before age 75.

Average YPLL-75 was highest for those dying of conditions arising in early infancy. This is not surprising, since such decedents generally die in infancy or early childhood. Compared to the numbers who died of cancer or heart disease, relatively few residents died of conditions arising in early infancy, but all of them contributed the maximum number of years (75) to total YPLL-75.

The "external" causes of death--motor vehicle accidents, homicide and legal intervention, non-motor-vehicle accidents, and suicide--ranked next in terms of average YPLL-75. While relatively few died of these causes (compared to cancer or heart disease), those decedents tended to be fairly young or middle aged. Cancer and heart disease killed large numbers of people. However, their victims tended, on average, to be elderly, producing relatively low average YPLL-75 measures.

Figure 54

AGE AT DEATH AND YEARS OF POTENTIAL LIFE LOST BEFORE AGE 75
BY CAUSE OF DEATH
CENTRAL TENDENCY AND DISPERSION*
MONTANA RESIDENTS, 1999

CAUSE OF DEATH	AVERAGE YPLL - 75	NUMBER OF DECEDENTS YOUNGER THAN 75	TOTAL YPLL - 75	MINIMUM AGE	MEAN AGE	MEDIAN AGE	MODAL AGE	MAXIMUM AGE	STANDARD DEVIATION	NUMBER OF DECEDENTS OF ALL AGES
All Causes	18.1	3,319	60,119	0	73.4	78	81	109	18.3	8,082
Certain Conditions Arising in the Perinatal Period	75.0	20	1,500	0	0.0	0	0	0	0.0	20
Homicide and Legal Intervention	40.3	30	1,210	0	37.5	36.5	30	81	19.7	32
Motor Vehicle Accidents	40.1	172	6,894	0	39.6	37	16	94	21.4	191
Non-Motor-Vehicle Accidents	34.1	174	5,931	0	57.2	58	88	106	27.7	269
Suicide	33.1	135	4,465	13	48.2	45	42	93	21.0	161
HIV Infection	31.7	6	190	32	43.3	37	37	60	12.7	6
Pneumonia & Influenza	24.6	47	1,158	0	80.5	86	90	102	18.5	248
Liver Disease & Cirrhosis	20.9	75	1,569	32	58.6	57	46	87	14.1	91
Septicemia	16.1	28	450	40	74.6	78	74	100	15.2	71
Diabetes Mellitus	13.2	95	1,254	8	74.9	77	75	99	13.9	243
Cerebrovascular Disease	13.0	113	1,471	0	81.7	84	80	108	12.5	591
Cancer	12.7	1,000	12,709	13	71.5	73	77	101	13.2	1,845
Heart Disease	12.2	698	8,520	0	77.7	80	83	109	13.4	2,034
C.L.R.D.	9.2	219	2,015	14	76	78	81	102	10.4	566
Alzheimer's Disease	5.4	16	87	69	85.5	86.5	88	99	7..03	204
Atherosclerosis	2.8	5	14	70	85.2	84	81	104	8.6	50

* The *mean* is the arithmetic average, the *median* is the midpoint, and the *mode* is the age for the greatest number of decedents. The *standard deviation* measures the concentration of the distribution around the mean.